

As end

- c) heating said second boat to heat the metal therein,
- d) heating said first boat to cause iodine vapor to flow downstream to contact said metal to form MI vapor,
- e) flowing said MI vapor out said outlet and
- f) contacting said MI vapor with said ammonia to form said MN.

13. The method of claim 1 wherein said MI is formed by the reaction:



Remarks

Claims 1-14 are in the present application.

The Office Action rejection of claims 1-8 and 13-14 as obvious under 35 USC 103 (a) over Vaudo et al ('581), in view of Yanashima et al ('542), is respectfully traversed.

Vaudo teaches passing HCl over high purity gallium to form GaCl, which is later reacted with ammonium to form GaN. However, Vaudo, as noted by the above Office Action, does not teach contacting a heated metal with HI or iodine vapor.

But, Yanashima et al is said to teach a hydride vapor phase epitaxy apparatus (Fig. 2) where HCl vapors are contacted with Ga and subsequently reacted with NH₃ to form GaN on a substrate. Yanashima also mentions that hydride gases useable for such epitaxy, include HI, which hydride gas formerly appeared in applicants' claims 1, 9 & 13.

However, as indicated herein, the hydride HI has been removed from applicants' claims 1, 9 & 13, while retaining iodine (I₂) vapor in such claims, which can be in considerably purer form as a vapor than its HI counterpart. A purer iodine vapor makes for a purer metal iodide (MI), which leads to a purer metal nitride (MN) product

deposited on a substrate.

A purer MN product means reduced defects or dislocations in the product, that can propagate into adjacent layers of an electronic device which can impair the function thereof. As neither of the above two references mentions the use of iodine vapor in a method for forming metal nitrides, per claim 1, as amended, claims 1 et seq. are believed distinguished over the above combined references.

Further, claims 2 - 12 and 13 & 14 are believed distinguished over the above applied references in view of their ultimate dependence from claim 1, which is believed novel thereover as discussed above.

The Office Action rejection of claims 9 - 12, as obvious under 35 USC 103 (a) over Vaudo et al ('581), in view of Yanashima et al ('542) and further in view of Jain ('163), is respectfully traversed.

Applicants claims 9 - 12 are believed distinguished over the above the first two references in view of their ultimate dependence from claim 1, as amended, which is believed novel thereover as discussed above. As to the Jain reference, it discloses, not a method for forming metal nitrides from a metal iodide, a 2 two step process, but a one step process wherein a gaseous stream of iodine is flowed through a wad of quartz wool containing silicon particles and by CVD, deposits silicon layers on a substrate. That is, silicon is carried by iodine to a substrate for deposit, still as silicone and not a different compound such as metal nitride.

Also, note the recitation in claim 8 wherein MN is formed as a vapor and deposited on a seed which can grow as a metal nitride of reduced defects or dislocations, which defects, as noted above, can propagate into adjacent layers of an

electronic device to disrupt the operation thereof. Thus, claim 8 defines a significant method for vapor deposition of MN and formation of a reliable product, low in defects.

The prior art, made of record, has been viewed is believed more removed from the claimed invention then are the applied references.

In view of the foregoing, the claims of record, as amended, are believed distinguished over the applied art and in condition for allowance.

In accordance with Section 714.01 of the M.P.E.P., the following information is presented in the event that a call may be deemed desirable by the Examiner: Thomas C. Stover, (781) 377-3779.

Respectfully submitted,



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Marked-up version of claims to show changes made to above clean version.

Amend the following claims

1. (Amended) A method of forming uniform metal nitrides (MN) comprising contacting heated metal with [hydrogen iodide (HI) or] iodine (I₂) vapor, at pressures below 760 Torr, to form a metal iodide (MI) and then contacting said MI with ammonia, at pressures below 760 Torr, to form said MN.
8. (Amended) The method of claim 1 wherein said MN is formed as a vapor and deposited on a [substrate or a] seed or self-nucleates on a nearby surface.
9. (Amended) The method of claim 1 wherein
 - a. iodine is placed in a first boat upstream in an elongated first container below an inlet for H₂ [or HI],
 - b. metal is placed in a second boat located downstream of said first boat in said first container, with an outlet thereof being positioned downstream of said second boat,
 - c. heating said second boat to heat the metal therein,
 - d. heating said first boat to cause iodine vapor to flow downstream to contact said metal to form MI vapor [or flowing said HI from said inlet downstream to contact said metal to form MI vapor],
 - e. flowing said MI vapor out said outlet and
 - f. contacting said MI vapor with said ammonia to form said MN.

13. (Amended) The method of claim 1 wherein said MI is formed by the reaction:

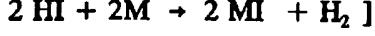


Exhibit A